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# मानक

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IS 11519 (1985): Piezoelectric Ceramic Cartridge for Squeeze Type Electronic Gas Lighters [LITD 5: Semiconductor and Other Electronic Components and Devices]



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“Knowledge is such a treasure which cannot be stolen”



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*Indian Standard*  
SPECIFICATION FOR  
PIEZOELECTRIC CERAMIC  
CARTRIDGE FOR SQUEEZE TYPE  
ELECTRONIC GAS LIGHTERS

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INDIAN STANDARDS INSTITUTION  
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG  
NEW DELHI 110002

# *Indian Standard*

## SPECIFICATION FOR PIEZOELECTRIC CERAMIC CARTRIDGE FOR SQUEEZE TYPE ELECTRONIC GAS LIGHTERS

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# *Indian Standard*

## SPECIFICATION FOR PIEZOELECTRIC CERAMIC CARTRIDGE FOR SQUEEZE TYPE ELECTRONIC GAS LIGHTERS

### 0. FOREWORD

**0.1** This Indian Standard was adopted by the Indian Standards Institution on 29 November 1985, after the draft finalized by the Piezoelectric Devices for Frequency Control and Selection Sectional Committee had been approved by the Electronics and Telecommunication Division Council.

**0.2** The object of this standard is primarily to prescribe the general requirement and methods of tests in respect of piezoelectric ceramic cartridge used in squeeze type electronic gas lighters.

**0.3** The piezoelectric ceramic cartridge is an essential part of electronic (domestic) gas lighters; when assembled in a striking mechanism (squeeze type) applying compressive force, a high voltage is generated across spark gap.

**0.4** This standard shall be referred to read in conjunction with IS:11013-1984\* for the purpose of concerned elements.

**0.5** For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS:2-1960†. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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### 1. SCOPE

**1.1** This standard deals with the general requirements and methods of tests for piezoelectric ceramic cartridge used in squeeze type electronic (domestic) gas lighters.

\*Specification for piezoelectric ceramic elements (impact type and squeeze type) for gas lighters.

†Rules for rounding off numerical values (*revised*).

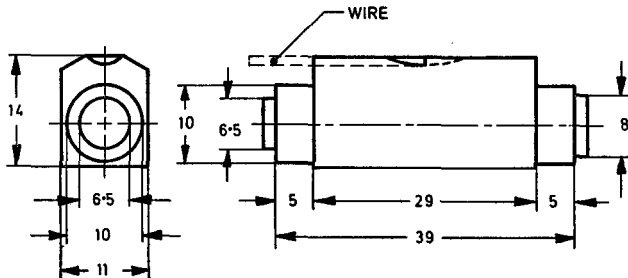
## 2. TERMINOLOGY

**2.0** For the purpose of this standard the terms and definitions given in IS:1885 ( Part 44 )-1978\* shall apply.

## 3. MATERIALS, CONSTRUCTION, WORKMANSHIP AND FINISH

**3.1 Materials** — The piezoelectric ceramic elements used in the cartridge shall have the material properties in accordance with Type 4 of IS:11014 ( Part 3 )-1985†.

**3.2 Construction** — Two piezoelectric ceramic elements are used in the cartridge, an insulation covering is made of polypropylene or high density polythene, the other parts such as washers, metal parts are shown in Fig. 1.



All dimensions in millimetres.

FIG. 1 PIEZOELECTRIC CERAMIC CARTRIDGE FOR SQUEEZE  
TYPE ELECTRONIC GAS LIGHTERS

**3.2.1 High Voltage** is generated by applying compressive force in two piezoelectric ceramic elements joined end to end through a central terminal with the positive electrodes opposing each other. The other faces of the elements are connected to the striking mechanism through metal parts. Sparks are generated across discharge gap while applying compressive force through a level system and also when the force is being released.

**3.3 Workmanship** — All parts of the piezoelectric ceramic cartridge shall be manufactured in accordance with good engineering practices.

**3.4 Finish** — All exposed metal parts shall be manufactured from materials of corrosion resistant or shall be treated to resist corrosion.

## 4. MARKING

**4.1** Each piezoelectric cartridge shall be marked with manufacturer's name or trade-mark, or manufacturer's code number, indelibly and legibly.

\*Electrotechnical vocabulary: Part 44 Piezoelectric devices.

†Specification for piezoelectric ceramic materials: Part 3 Type 4 and 8.



## 4.2 Each piezoelectric ceramic cartridge may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution ( Certification Marks ) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers or processors, may be obtained from the Indian Standards Institution.

## 5. CLASSIFICATION OF TESTS

**5.1 Type Tests** — The manufacturer shall submit samples in accordance with 5.1.1 and the sequence of type tests shall be as given in 5.1.2.

**5.1.1 Number of Samples** — The number of samples for type test shall be twelve (12) of same code number, unless otherwise stated in the relevant specification.

**5.1.2 Sequence of Type Test** — The sequence of type test shall be in accordance with Table 1 unless otherwise specified in the relevant specification.

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TABLE 1 SEQUENCE OF TYPE TEST

SL No.	TEST	CLAUSE NUMBER
(1)	(2)	(3)
i)	Visual examination	6.1
ii)	Dimensions	6.2
iii)	Capacitance	7.1
iv)	Output voltage	7.2
v)	Durability	7.3
vi)	Insulation	7.4
vii)	Insulation resistance	7.5
viii)	Heat resistance	7.6
ix)	Humidity characteristics	8.1
x)	Moisture characteristics	9.1

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**5.2** The following tests shall constitute routine tests and shall be carried out on each piezoelectric ceramic cartridge:

- a) Visual examination ( 6.1 ),
- b) Dimensions ( 6.2 ),
- c) Capacitance ( 7.1 ), and
- d) Output voltage ( 7.2 ).

**5.3 Acceptance Tests** — The acceptance tests shall be carried out on a limited number of samples, selected in accordance with IS:10673-1983\* from the lot which has been subjected to and satisfactorily completed the routine tests specified in 5.2.

Two groups of samples one for non-destructive tests ( Group A ) and another for destructive tests (Group B) shall be selected in accordance with IS:10673-1983\* and the samples in each group shall be subjected to the tests as given in Table 2.

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**TABLE 2 ACCEPTANCE TESTS**

TEST	CLAUSE NUMBER	AQL ( PERCENT PERFECTIVE )	*INSPECTION LEVEL	†N/D
(1)	(2)	(3)	(4)	(5)
<i>Group A</i>				
Visual examination	6.1	1	II	<i>N</i>
Insulation	7.4			
Insulation resistance	7.5			
<i>Group B</i>				
Durability	7.3	4	S-3	<i>D</i>
Visual examination	6.1			

NOTE — Samples which have been subjected to destructive tests shall not be returned to the lot.

\*IS:10673-1983 Sampling plans and procedures for inspection by attributes for electronic items.

†N for non-destructive tests and *D* for destructive tests.

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\*Sampling plans and procedures for inspection by attributes for electronic items.

## 6. GENERAL TESTS

**6.1 Visual Examination** — The piezoelectric ceramic cartridge shall be tested visually for workmanship, finish, condition and marking, and these shall be satisfactory.

**6.2 Dimensions** — The dimensions shall be checked for compliance with those specified in the relevant specification and as per manufacturer drawings.

## 7. ELECTRICAL TESTS

**7.1 Capacitance** — The capacitance of piezoelectric ceramic cartridge may be measured at 1 KHz in an LCR Bridge and it will depend on the size of the element in the cartridge. The capacitance value of piezoelectric ceramic cartridge for squeeze type shall be 36 pF (*Min*) and 53.8 pF (*Max*) for the elements of 6.35 mm dia and 15 mm length. The dielectric constant calculated from the capacitance and the size of the element, shall be  $1200 \pm 20$  percent.

$$\text{Dielectric Constant } (K_s^t) = \frac{\text{Capacitance} \times \text{thickness}}{\text{Area} \times 8.86 \times 10^{-12}}$$

**7.2 Output Voltage** — The output voltage is determined by dropping a steel ball of 11.8 g (size 14 mm dia) from a height of 50 cm to the surface of capital of the cartridge. The output voltage is measured from the waveform on the CRT of oscilloscope with a frequency response dc to 50 KHz. The output voltage shall be more than 10 kV.

**7.3 Durability** — The durability of piezoelectric ceramic cartridge shall be tested in an accelerated test jig. The cartridge shall withstand at least 10 000 squeezes at the speed of six drivings a minute under normal temperature and generate output voltage across a discharge gap of 3 mm while testing. The output voltage shall be more than 85 percent of the original output voltage.

NOTE — This test may be carried out for a particular batch taking 10 percent as the sample.

**7.4 Insulation** — It shall be inspected as to each compression whether any flash over occurs or not inside the case.

**7.5 Insulation Resistance** — The insulation resistance between high tension lead wire and the body earth shall be 100 M  $\Omega$  (*Min*).

**7.6 Heat Resistance** — After continuous heating for one hour in an oven kept at  $70^\circ\text{C} \pm 1^\circ\text{C}$  the output voltage shall be more than 85 percent of the original output voltage and there shall be no physical change.

## **8. HUMIDITY CHARACTERISTICS**

**8.1** While being subjected to 40°C and 90 to 95 percent relative humidity for 100 hours, the output voltage shall be measured at the end of the test. There shall be no appreciable change in the output voltage.

## **9. MOISTURE PROOF CHARACTERISTICS**

**9.1** The piezoelectric ceramic cartridge shall have superior or moisture proof characteristics. High quality silicone grease/oil makes up the air gap between the element and eliminates insulation damping and flash over inside the case even in high humid conditions.